





EAST AFRICAN COMMUNITY



EDICT OF GOVERNMENT

In order to promote public education and public safety, equal justice for all, a better informed citizenry, the rule of law, world trade and world peace, this legal document is hereby made available on a noncommercial basis, as it is the right of all humans to know and speak the laws that govern them.

EAS 245-1 (2001) (English): Coated fabrics – Methods of test – Part 1: Determination of roll characteristics



BLANK PAGE





EAS 245-1:2001
ICS 59.080.40

EAST AFRICAN STANDARD

Coated fabrics — Methods of test — Part 1: Determination of roll characteristics

EAST AFRICAN COMMUNITY

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to achieve this objective, the Partner States in the Community through their National Bureaux of Standards, have established an East African Standards Committee.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

© East African Community 2001 — All rights reserved*

East African Community

P O Box 1096

Arusha

Tanzania

Tel: 255 27 2504253/8

Fax: 255-27-2504481/2504255

E-Mail: eac@eachq.org

Web: www.each.int

*

© 2001 EAC — All rights of exploitation in any form and by any means reserved worldwide for EAC Partner States' NSBs.

Introduction

This part 1 of this East African Standard lays down methods of test for determining the characteristics of a roll of coated fabric. It stipulates methods for establishing the length, width, thickness and mass of rolls or pieces of coated fabrics. Annex A has been incorporated to serve as a guideline when removing coatings of specific compositions during mass determinations for coating material or textile substrate fabric.

The other parts of this East African Standard will deal mainly with the determination of performance characteristics of coated fabrics.

During the preparation of this part 1 of this East African Standard, reference was made to the following publications:

BS 3424, *Testing coated fabrics —*

Part 1: *Method for determination of roll characteristics.*

Part 2 and 3: *Method for determination of thickness of coated fabrics.*

ISO 2286, *Rubber or plastics-coated fabrics — Determination of roll characteristics.*

Acknowledgement is hereby made for the assistance received from these sources.

Coated fabrics — Methods of test — Part 1: Determination of roll characteristics

1 Scope

This Part 1 of this East African Standard specifies methods of test for determining length, width, net mass, mass per unit area and thickness of rolls of coated fabrics.

2 Definitions

For the purposes of this Part 1 of this EAS 245, the following definitions shall apply.

2.1

usable width

the width of a roll limited by the points within the coated fabric fulfils the specified requirements.

2.2

thickness

the distance between the face and the back of a coated fabric measured as the vertical distance between a reference plate on which the coated fabric rests and a parallel presser foot that is applying a pressure to the coated fabric.

2.3

roll

a package of one continuous coated fabric wound on a tube or a former not less than 10 m.

3 Determination of the length of a roll

3.1 Reference method

3.1.1 *Apparatus*

Flat table — not less than 5 m long and at least as wide as the roll to be tested. Both longitudinal edges of the table shall be marked off in 1 m lengths, at least one of these lengths, preferably at one end of the table, being sub-divided into 1 cm divisions.

3.1.2 *Procedure*

Trim the cut end of the roll, if necessary, so that it is at right angles to the lengthwise direction of the roll, such trimming being confined to the minimum which is necessary to effect this. With the cut end of the roll aligned with the zero mark on the table (see 3.1.1.1), unroll the material along the table so that no tension is introduced. On reaching the limit of the table, mark the back of the roll by some suitable method on both edges to coincide with a known division of length. Re-roll the portion that has been measured. Lay out, free from tension, a further portion of the unmeasured length and measure from the marked edges as before.

Repeat this process until the end of the roll is reached, trimming this, if necessary, as before. Measure the final length to the nearest 5 cm.

3.2 Alternative method

As an alternative to the manual technique described in 3.1, any suitable mechanical, electromechanical or photoelectric means of measuring the coated fabric length that gives results equivalent to these obtained using the method in 3.1 shall be used.

NOTE The above alternative means of measurement may not, however, be suitable for extensible coated fabrics, such as those having a knitted substrate.

3.3 Expression of results

Report the length of roll, in metres, as the sum of all readings, rounded to the nearest 0.1 m.

4 Determination of the width of a roll

4.1 Apparatus

4.1.1 Flat table - Not less than 2 m long and at least as wide as the roll to be tested.

4.1.2 Steel scale – of length greater than the width of the roll to be measured, graduated in millimeters.

4.2 Procedure

While the coated fabric is unrolled on the table (see 4.1.1) and free of tension during measurements taken at 3.1, using the scale (see 4.1.2.) measure and record, at intervals of 10 m, the usable width of the coated fabric to the nearest 5 mm, ensuring that all measurements of width are taken at right angles to the longitudinal direction of the roll.

For rolls less than 20 m long, measure the width at three positions, i.e near the two ends and in the middle of the roll.

4.3 Expression of results

Calculate the mean of the recorded widths and report the value obtained as the average usable width to the nearest 0.005 m.

Report also the minimum usable width recorded.

5 Determination of the net mass and mean mass per unit area of a piece, cut, roll or sample

5.1 Apparatus

Weighing device – with a calibrated scale, accurate at full scale deflection to 0.01 %.

5.2 Procedure

Place the roll of material centrally in the pan or other supporting arrangement of the weighing device (see 5.1.1.1). Ensure that the roll and its support are free from contact with other bodies. Determine and record the gross mass.

5.1.2.2 Determine and record the mass of the tube or former upon which the material has been rolled and deduct this from the gross mass. Record the figure thus obtained as the net mass.

5.1.2.3 Determine the length and width of the roll in accordance with the procedures given in 3 and 4, and calculate the mean mass per unit area, in grams per square metre rounded to the nearest 5 g.

NOTE Any estimate of the mean mass per unit area of the coated fabric derived from the total net mass of the roll and its known length and width may be inaccurate owing to the fact that a complete roll of coated fabric cannot normally be conditioned to equilibrium in the standard atmosphere of conditioning and testing. Such inaccuracies are due to excesses or deficiencies in moisture regain through the complete roll.

5.1.3 Expression of results – The net mass shall be expressed in kilograms to the nearest 0.10kg. The mean mass per unit area shall be expressed in grams per square metre, rounded to the nearest 5 g/m².

5.2 Determination of the mass per unit area of a sample

5.2.1 Apparatus

Balance – Accurate to 0.005 g.

5.2.2 Test piece – The test piece shall be square or circular in form, and have an area of $100 \text{ cm}^2 \pm 1 \text{ cm}^2$

5.2.3 Procedure

5.2.3.1 Cut from the sample three test pieces, one from the centre and the other two symmetrical with the first, in such a manner that their external edge is between 5 cm and 15 cm from the selvedge of the sample taken along a line which makes an angle 45° with the length of the roll. Designate these test pieces A, B and C respectively.

5.2.3.2 Dry the test pieces to constant mass in an atmosphere with a relative humidity not higher than 10 per cent at a temperature between 60°C and 70°C .

NOTE Air at 20°C and 65 per cent relative humidity will, when heated at constant pressure to between 60°C and 70°C , have a relative humidity of approximately 5 per cent. Higher temperature can lead to changes in some coatings.

5.2.3.3 Condition the test pieces according to the procedure described in Part 2 of EAS 245, *Conditioning of test specimens*.

5.2.3.4 Weigh the test pieces to the nearest 0.005 g and calculate the mass per unit area, in grams per square metre.

5.2.4 Expression of results — The mass per unit area shall be expressed as the average of the calculated values, in grams per square metre.

NOTE As the presence of residual solvent may cause shrinkage of the cut test pieces during conditioning, the area should be checked immediately after conditioning and weighing. If this area differs from that obtained in the original measurement, the second value should be used in the calculation.

5.3 Determination of mass per unit area of the substrate cloth (base cloth)

5.3.1 Materials

CAUTION Some of the solvents which have to be used may be of a toxic, flammable or other hazardous nature. Care in handling of such materials must be exercised. The inhalation of vapours should be avoided. Suitable protective clothing, including gloves and goggles, should be worn when appropriate. It is recommended that a suitable eyewash be kept in a position convenient for use. Any further precautionary measures recommended by the solvent manufacturer may be followed.

5.3.1.1 Suitable solvent system (stripping medium) — Which has no solvent or chemical action on the substrate cloth. Particular care should be taken if there are bonding agents or finishing treatments on the substrate cloth which are not essentially part of the coating by which may be removed with it (e.g. bonding agents in non-woven bonded-fibre fabrics, rot-proofing agents, etc.). If it is known or suspected that such material has unavoidably been removed with the coating, this shall be reported with the results.

NOTE A suitable solvent system may be an organic liquid; a mixture of organic liquids, water or an aqueous solution (see Annex A).

5.3.1.2 Acetone

5.3.2 Apparatus

5.3.2.1 Balance – accurate to 0.005 g.

EAS 245-1:2001

5.3.2.2 *Flask* – capacity 500 ml, fitted with a reflux condenser.

5.3.2.3 *Water bath*

5.3.2.4 *Oven* – with air circulation, capable of being controlled at 100 °C.

5.3.3 *Test pieces* – The piece shall have an area of $100 \text{ cm}^2 \pm 1 \text{ cm}^2$

5.3.4 *Procedure*

5.3.4.1 Cut from the sample three test pieces, one from the centre and the other two symmetrical with the first in such a manner that their external edge is between 5 cm and 15 cm from the selvedge of the sample, taken along a line which makes an angle of 45° with the length of the roll. Designate these test pieces A, B and C respectively.

5.3.4.2 Immerse each test piece separately in 150 ml of the solvent or stripping agent (see clause 5.3.1.1) in the flask (see clause 5.3.2.2). Extract by refluxing for 30 min on the water bath (see clause 5.3.2.3), decant and remove where possible the bulk of the coating by hand from the cloth.

Reflux again for 30 min, using fresh solvent, and decant. Thereafter, immerse the fabric and any loose threads in 150 ml of solvent with occasional agitation for 30 min at room temperature. Remove the stripped test pieces together with any loose threads from the solvent and wash them in 100 ml of the acetone (see 5.3.1.2). Dry the test pieces for 1 h in the oven (see 5.3.2.4), controlled at a temperature of approximately 100 °C.

5.3.4.3 Condition the stripped test pieces for 24 h in accordance with KS 08-1076: Part 2 and weigh to the nearest 0.005 g.

5.3.4.4 Wash the stripped test pieces with a further quantity of the appropriate solvent in the manner indicated, wash in acetone, dry and condition and weigh them as before. If the second weighing differs from the first by more than 1 % repeat the solvent treatment until the difference is less than 1 per cent. Use the final mass for calculating the mass per unit area of the fabric.

5.3.5 *Expression of Results* – The mass per unit area of the fabric shall be expressed as the mean value obtained from the three results in grams per square metre, rounded to the nearest 1 g/m^2

5.4 Determination of the mass per unit area of the coating

5.4.1 *Procedure*

5.4.1.1 It is expedient to consider the mass per unit area of the coating as the difference between the mass per unit area of the coated fabric and the mass per unit area of the base fabric.

5.4.1.2 From the mass per unit area of the coated fabric (determined according to clause 5.2), subtract the mass per unit area of the base fabric for the corresponding test piece (determined according to 5.3).

5.4.2 *Expression of results* – The mass per unit area of the coating shall be expressed in grams per square metre, rounded to the nearest 5 g/m^2 , as the mean of the three values found in accordance with the procedure given in 5.4.1.

6 Determination of thickness

6.1 *Apparatus*

6.1.1 *Gauge* – of the dead weight type, and equipped with a dial graduated to read directly to 0.02 mm. The gauge shall be constructed so as to permit one of the pressures specified in 6.1.2.

6.1.2 *Presser foot* – smooth and circular, having a diameter of 9.5 mm (1 %, or $25.22 \text{ mm} \pm 1 \text{ %}$, or $28.55 \text{ mm} \pm 1 \text{ %}$).

6.1.3 *An anvil (reference plate)* - having a plane upper surface. The presser foot and anvil surfaces shall be plane and parallel to within normal engineering tolerances.

6.2 Procedure

6.2.1 Measure the thickness at five evenly spaced positions across the full width of the coated fabric, preferably at a distance of about 1 m from the end of the roll, the first measurement at each side being taken at a position between 5 cm and 15 cm from the selvage.

6.2.2 Place the coated fabric on the anvil (see 6.1.3), smooth but without tension. Lower the presser foot (see 6.1.2) onto the material without impact, allow it to rest for 10 s, exerting a pressure of 2 kPa, as required by the material specification. Observe and record the dial reading.

6.3 Expression of results — Express the results in millimetres to three significant figures.

7 Test report

The test report shall include the following information:

- a) reference to this East African Standard;
- b) the description of the coated fabric;
- c) the length of the roll;
- d) the width of the roll;
- e) the net mass;
- f) the net mass per unit area;
- g) the mass per unit area of the fabric;
- h) the mass per unit area of the coating;
- i) the thickness and the pressure at which it was measured and
- j) the dimensions of the presser foot used.

Annex A
(normative)

Methods for removing coating of specific compositions

A.1 General

The specific methods described in A.2 to A.5 have been found satisfactory for some of the most frequently encountered coatings.

A.2 simple polyvinyl chloride composition

CAUTION Attention is drawn to the fact that there is a risk of an explosion occurring if tetrahydrofuran is evaporated, unless the precaution is taken of making sure that no peroxides are present by adding ferrous sulphate.

A.2.1 If the coating is continuous and on one side only, wet the substrate cloth of the test specimens with either tetrahydrofuran or butanone complying with the relevant East African Standard and, where possible, separate the bulk of the coating mechanically from the substrate cloth. Immerse each specimen separately in 100ml of tetrahydrofuran or butanone, with occasional agitation, for 20 min at room temperature. Attention is drawn to the cautionary note of clause 5.3.1.

A.2.2 Remove the stripped specimens together with any loose threads from the stripping solvent and wash them in 100ml of acetone. Dry the specimens for 1 h at $65\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, determine their mass to the nearest 5 mg. Condition the specimens in accordance with KS 08-1076: Part 2 and finally determine their mass to the nearest 5 mg to obtain the substrate cloth mass per unit area.

A.3 Nitrocellulose compositions

A.3.1 Wet the substrate cloth backing of the test specimens with acetone complying with the relevant East African Standard and, where possible, separate the bulk of the coating mechanically from the substrate cloth. Immerse each specimen separately in 100 ml of acetone contained in a flask fitted with a reflux condenser.

A.3.2 After refluxing for a period of 20 min, reflux the substrate cloth plus any loose threads for a similar period in a further 100 ml of clean acetone. Remove the stripped specimens from the solvent, dry them for 1 h at $65\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and determine their mass to the nearest 5 mg and repeat until successive determinations differ by less than 1 per cent. Condition the specimens as described in KS 1076-2 and determine the mass to the nearest 5 mg to obtain the substrate cloth mass per unit area.

NOTE Attention is drawn to the cautionary note in 5.3.1.

A.4 Polyurethane compositions

A.4.1 Immerse each specimen separately in a solution made up as follows:

Propane-1, 2-diol	100 parts by mass
Potassium hydroxide (solid)	3 parts by mass
Water	1 part by mass
N-methyl-2-pyrrolidane	25 parts by mass

NOTE Attention is drawn to the cautionary note in 5.3.1. Heat to $48\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and maintain that temperature for a period of 30 min or until the coating has been removed.

A.4.2 Remove the specimen from the solution, wash in acetone complying with the relevant East African Standard and then wash well with water; dry the specimen for 1 h at $65\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and condition as described in KS 08-1076:Part 2.

Determine the mass to the nearest 5 mg to obtain the substrate cloth mass per unit area.

NOTE The above mixture will not attack cotton, nylon, or polyester fibres, provided that the maximum temperature specified, i.e. 500 °C, is not longer than 30 min. If the substrate is of acetate material, the washing agent used should be ethanol complying with the relevant East African Standard in lieu of acetone.

However, polyacrylate ties coats, if used, will only swell in the mixture and will not dissolve.

A.5 Natural rubber on cotton

CAUTION In carrying out the following test, due notice should be taken of the potentially hazardous nature of the reagent used. Particular care should be taken to prevent the nitrobenzene boiling over and creating an immediate flammability risk. Attention is also drawn to the cautionary note in 5.3.1.

A.5.1 Immerse each test specimen separately in nitrobenzene contained in a flask fitted with an air conditioner and reflux for 1 h. Allow to cool. Remove the specimens, including any loose threads. Using a blunt edged spatula remove any swollen polymer.

A.5.2 Repeat the above procedure, using fresh nitrobenzene at each refluxing, until all the coating polymer has been removed.

Wash in acetone complying with the relevant East African Standard until all traces of nitrobenzene have been removed.

If any polymer remains present on the specimen repeat the complete procedure including refluxing in fresh nitrobenzene, remove remaining traces of polymer, wash in acetone and dry at $65\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for not less than 10 min.

A.5.3 Condition the specimens in accordance with the requirements of KS 08-1076: Part 2 and determine the mass of the specimens to the nearest 0.005 g to obtain the substrate cloth mass per unit area.